

**Amendments to the Claims**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (original): A microfluidic device comprising:  
a first chamber adapted to retain one or more first components for a desired reaction;  
a second chamber;  
at least one second component retained in the second chamber, the at least one second component comprising one or more of an enzyme, a catalyst, an initiator, a promoter, and a cofactor, for the desired reaction; and  
an openable communication between the first and second chambers.

Claim 2 (original): The microfluidic device of claim 1, further including at least one first component retained in the first chamber.

Claim 3 (original): The microfluidic device of claim 1, wherein the second component is a catalyst.

Claim 4 (original): The microfluidic device of claim 3, wherein the catalyst contains magnesium.

Claim 5 (original): The microfluidic device of claim 3, wherein the catalyst is an aqueous solution containing  $Mg^{2+}$  ions.

Claim 6 (original): The microfluidic device of claim 1, wherein the second component is an initiator.

Claim 7 (original): The microfluidic device of claim 1, wherein the second component is a promoter.

Claim 8 (original): The microfluidic device of claim 1, wherein the second component is a cofactor.

Claim 9 (original): The microfluidic device of claim 1, further comprising reactants for a nucleic acid sequencing or amplification reaction, the reactants being disposed in the first chamber.

Claim 10 (original): The microfluidic device of claim 1, wherein the openable fluid communication comprises a valve.

Claim 11 (original): The microfluidic device of claim 10, wherein the valve comprises a Zbig valve.

Claim 12 (original): The microfluidic device of claim 10, wherein the valve comprises an adhesive material.

Claim 13 (original): The microfluidic device of claim 10, wherein the valve comprises a recloseable valve.

Claim 14 (original): The microfluidic device of claim 1, further comprising:  
a third chamber; and  
an openable fluid communication between the third chamber and at least one of the first and second chambers.

Claim 15 (original): A method, comprising:  
providing a microfluidic device comprising:  
a first chamber;  
at least one first component retained in the first chamber, the at least one first component comprising one or more reactant or reagent or component for the desired reaction;  
and  
a second chamber;  
at least one second component retained in the second chamber, the at least one second component comprising one or more of a catalyst, an initiator, a promoter, and a cofactor for a desired reaction; and  
an openable communication between the first and second chambers;  
opening the openable fluid communication between the first and second chambers;  
at least one of combining and mixing the at least one first component with the at least one second component.

Claim 16 (original): The method of claim 15, further comprising the step of heating the microfluidic device;

Claim 17 (cancelled)

Claim 18 (original): The method of claim 15, wherein one or more of the at least one first component and the at least one second component comprise double-stranded DNA or double-stranded DNA fragments.

Claim 19 (original): The method of claim 16, wherein heating the microfluidic device comprises heating of at least one of the first and second chambers to a temperature sufficient to denature the double-stranded DNA or the double-stranded DNA fragments.

Claim 20 (original): The method of claim 16, further comprising:  
cooling the microfluidic device to a temperature sufficient to allow single-stranded DNA or single-stranded DNA fragments to anneal to other single-stranded DNA or single-stranded DNA fragments.

Claim 21 (original): The method of claim 20, wherein cooling the microfluidic device causes the mixture to undergo a nucleic acid, amplification, ligation, endonuclease, or sequencing reaction.

Claim 22 (original): The method of claim 15, wherein the method further includes injecting a sample into the first chamber.

Claim 23 (original): The method of claim 15, wherein at least one of the first chamber and the second chamber is at least partially pre-filled with a nucleic acid sequence amplification reaction component.

Claim 24 (original): The method of claim 15, wherein at least one of the first chamber and the second chamber is pre-filled with a nucleic acid sequence amplification reaction component.

Claim 25 (original): The method of claim 15, wherein at least one of the first chamber and the second chamber is at least partially pre-filled with a nucleic acid sequence detection reaction component.

Claim 26 (original): The method of claim 15, wherein at least one of the first chamber and the second chamber is pre-filled with a nucleic acid sequence detection reaction component.

Claim 27 (original): The method of claim 15, wherein at least one of the first chamber and the second chamber is at least partially pre-filled with a nucleic acid sequence restriction reactant component.

Claim 28 (original): The method of claim 15, wherein at least one of the first chamber and the second chamber is pre-filled with a nucleic acid sequence restriction reaction component.

Claim 29 (original): The method of claim 15, wherein causing the contents to combine comprises applying centripetal force to the first and second chambers.

Claim 30 (original): The method of claim 15, wherein the first chamber retains a buffer, a polymerase, dNTPs, and at least one of a primer and a probe and the second chamber retains an aqueous solution of Mg<sup>2+</sup> ions.

Claim 31 (original): The method of claim 30, wherein at least some of the dNTPs are ddNTPs.

Claim 32 (original): The method of claim 15, wherein the at least one second component comprises a catalyst.

Claim 33 (original): The method of claim 15, wherein the at least one second component comprises an initiator.

Claim 34 (original): The method of claim 15, wherein the at least one second component comprises a promoter.

Claim 35 (original): The method of claim 15, wherein the at least one second component comprises a magnesium catalyst.

Claim 36 (original): The method of claim 15, wherein the at least one second component comprises an enzyme.

Claim 37 (original): The method of claim 15, wherein the at least one second component comprises a cofactor.

Claim 38 (original): The method of claim 15, wherein at least one of the first and the second chambers are preheated.

Claim 39 (original): The method of claim 15, wherein the at least one second component is a salt of magnesium that has been dried down in the second chamber.

Claim 40 (original): The method of claim 15, wherein the at least one second component is a salt of magnesium.

Claim 41 (original): The method of claim 15, wherein the at least one second component includes magnesium and glycerol.

Claim 42 (original): The method of claim 15, wherein the at least one first component and the at least one second component are combined, the combined components are heated, and the heated combined components are mixed.

Claim 43 (original): The method of claim 42, wherein the heated combined components are mixed by thermal mixing.

Claim 44 (original): The method of claim 42, wherein the heated combined components are mixed by thermally-activated solutization.

Claim 45 (original): The method of claim 42, wherein the heated combined components are mixed by vortexing.

Claim 46 (original): The method of claim 42, wherein the heated combined components are mixed by sonication.

Claim 47 (original): The method of claim 42, wherein the heated combined components are mixed by shaking.

Claim 48 (new): A method, comprising:

providing a microfluidic device comprising:

a first chamber;

at least one first component retained in the first chamber, the at least one first component comprising one or more reactant or reagent or component for the desired reaction;  
and

a second chamber;

at least one second component retained in the second chamber, the at least one second component comprising one or more of a catalyst, an initiator, a promoter, and a cofactor for a desired reaction; and

an openable and closeable communication between the first and second chambers, the method comprising:

opening the openable and closeable fluid communication between the first and second chambers;

at least one of combining and mixing the at least one first component with the at least one second component; and

closing the openable and closeable communication between the first and second chambers.